Saskatchewan Ministry of Agriculture

CROP PRODUCTION NEWS

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PRODUCTION

CROP PRODUCTION

Editor's Comments

By Faye Dokken-Bouchard, PAg, Crops Branch

The 2010 growing season has seen an unprecedented amount of rain in Saskatchewan with many acres left unseeded as a result. The questions coming into the Agriculture Knowledge Centre (AKC), Regional Services and Crops Branches, as well as samples received at the Crop Protection Laboratory, reflect the impact of excess moisture in the field. One example is white spots on lentils due to rupturing of cell walls. For more information on this phenomenon, see our AKC and Lab updates below.

This edition of Crop Production News will continue to address some common questions associated with farming in a wet year, including information on sulphur deficiencies, what to do with unseeded acres, disease management and crop considerations for flooded areas.

With spring seeding virtually complete in one way or another, our attention turns to crop development and integrated pest management. The *2010 Guide to Crop Protection* includes extensive product information on herbicides, insecticides and fungicides (see www.agriculture.gov.sk.ca/Guide_to_Crop_Protection), as well as proper staging and application guidelines.

For an update on provincial seeding and crop progress, see the weekly Crop Report at www.agriculture.gov.sk.ca/Crop-Report.

NOTE: Throughout this document, you will see that some publications are in blue font and underlined, indicating links to website information. If you are reading this on your computer screen, click your cursor on the link to take you directly to the website. ✿

Crop Production News is a biweekly publication prepared primarily by provincial specialists with the Crops Branch and Regional Services Branch of the Saskatchewan Ministry of Agriculture. It is a compilation of articles related to entomology, plant pathology, weed science, soils and agronomy issues.

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Crop Topics at the Agriculture Knowledge Centre

By Brent Flaten, PAg, Integrated Pest Management Specialist

Complications from wet weather have dominated recent inquiries into the Agriculture Knowledge Centre. People want to know if nutrient losses are occurring in water logged soils (mainly nitrogen) and implications for top dressing fertilizer. Crop scouting is the most important step to take as soil conditions need to return to normal (field capacity) before additional input needs can be assessed. As the soils return to normal conditions, mineralization of nitrogen will also be occurring, replenishing the nitrogen supply.

The wet weather has also delayed herbicide applications. In some crops, especially pulses, the crop is now past the crop stage window of application. Producers are considering herbicides registered for aerial application. Land rolling of pulses has also been delayed, and in some cases they are beyond the stage of safe rolling. Crops are yellowing due to water stress and leaf diseases have become prevalent. In some cases producers are looking at mixing fungicides with their herbicide while others are waiting for crops to recover from disease with new growth and reassess fungicide needs at a later stage.

Other popular topics are what kind of crops can be seeded and harvested before expected frosts, as well as annual crop options for green feed and fall grazing. In some cases, producers have been considering seeding crops for the sole purpose of drying the soil in preparation for seeding next year. In this case they may not be concerned about harvesting the crop.

A common topic is the chlorotic speckling of lentil leaves (Figure 1). This is not caused by a pathogenic organism but is most likely a physiological reaction to prolonged wet weather causing rupturing of cell walls. Lack of oxygen in the root zone and an inability to absorb some nutrients such as potassium are commonly cited. Theories vary on the impact to the plant. General yellowing of leaves and leaflet drop due to water stress are also being reported (Figure 2). Warm sunny dry conditions will help most plants out-grow these symptoms. In some cases, diseases such as ascochyta have also been identified on the same plant as the stress-related symptoms.

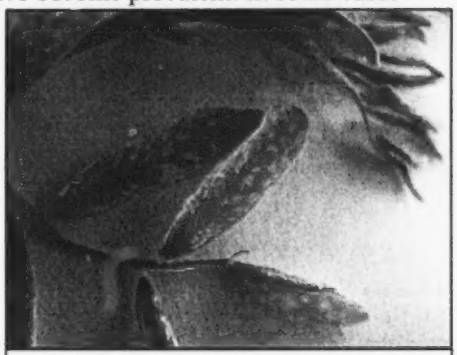

Figure 1. White speckling on lentil leaflets due to wet weather, causing cell rupture.
Source: Jennifer Deeks, Viterra

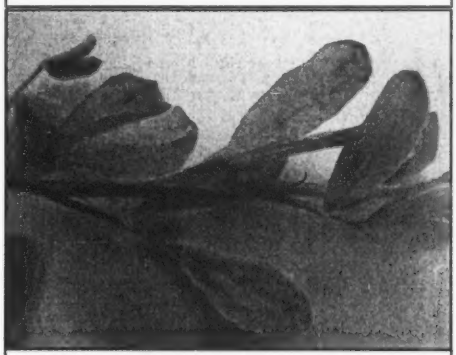

Figure 2. Yellowing of lentil leaflets due to water stress.
Source: Jennifer Deeks, Viterra

(Continued on page 3)

Crop Topics at the Agriculture Knowledge Centre **(Continued from page 2)**

On the forage side, there is growing concern that the rain, standing water and high humidity may inhibit harvesting of the great-looking hay stands.

Higher than normal damage from cutworms is being reported and growers are requesting recommendations for spraying decisions. Many people are asking how the rains will affect grasshopper populations. Wet weather mostly affects small, newly-hatched grasshoppers. At this time we do not know how many have hatched. Scouting is recommended to assess grasshopper populations and determine the impact of the rain.☼

Crop Protection Laboratory Update

By Philip Northover, AAg, Supervisor, Crop Protection Laboratory

The two crops that have been submitted most frequently over the past two weeks are lentils and alfalfa. Spring black stem and leaf spot was diagnosed on alfalfa. Warm, dry weather should reduce further development of this disease (for further information see CPN, May 27th issue). Concerns among lentil growers have been around several different problems:

1) Ascochyta blight and stemphylium blight (two fungal diseases),
2) yellowing of the entire plant, and
3) white to light tan coloured speckling of the leaves/leaflets.

Ascochyta is fairly well known, and stemphylium received a lot of attention for the brown to grey appearance it imparted to crops in August of 2009. Yellow plant samples appeared to be at least partly attributed to excessive moisture and perhaps root rot. White speckling/stippling has been attributed to a physiological response to waterlogged soils, as described by Faye Dokken-Bouchard and Brent Flaten in this edition of CPN. Portions of the developing leaflet rupture then die, leaving the bleached/pale tan coloured areas.

Spot anthracnose of green ash has also been diagnosed recently (Figure 3). This relatively uncommon disease has been observed several trees in Regina this spring. Of six Dutch elm disease submissions diagnosed, five were negative for dutch elm disease, and one has dothiorella wilt, another serious wilt disease of elm. Other disease samples include spot blotch of barley, fusarium blight of turfgrass, and canola damping-off.

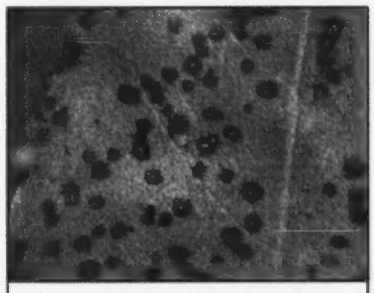

Figure 3. Spot anthracnose of ash. Source: Saskatchewan Agriculture

Weeds recently identified include: starflowered solomon's seal (*Smilacina stellata*), poverty weed (*Iva axillaris*), and blue mustard (*Chorispora tenella*).

Insects identified include an eriophyid mite of plum, a scarab beetle and a red backed cutworm. ☼

Crop Scout for Sulphur Deficiencies in Canola and Mustard until the Full Flower Stage

By Ken Panchuk, PAg, Provincial Specialist, Soils

Shallow rooting of field crops may occur this year in areas where soil rooting depth is now full of water. Plants will generally root no deeper than is necessary to get moisture for growth. Nutrients like plant available sulphate-sulphur, where low rates are generally applied during seeding, may be deficient this year. With moisture conditions as they are, mineralization of nitrogen, phosphorous and sulphur will occur during the growing season. This may be enough to provide sulphate-sulphur, but there will likely be deficient patches in the field. Crop scouting on a frequent, regular basis is the only sure way to know if your canola and mustard are getting enough sulphate-sulphur. Now is the time to start scouting and take corrective measures if sulphur was not added to canola and mustard fields at seeding.

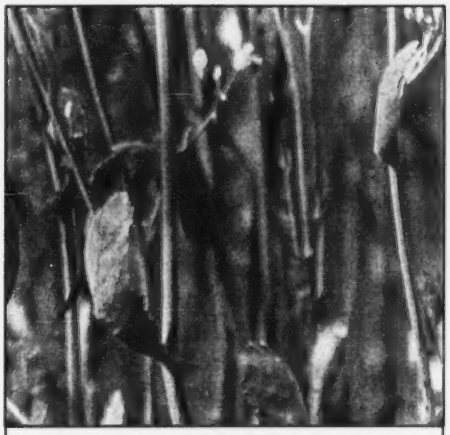

Figure 4. Sulphur deficient canola at bolting to early flower stage.
Source: Saskatchewan Agriculture

Canola and mustard have high requirements for sulphur. Sulphur is immobile in plants; therefore a constant supply is required throughout the growing season, from emergence to the completion of seed filling. If plants run out of sulphur at the seed-filling stage, the result will be empty pods and/or poorly formed seeds.

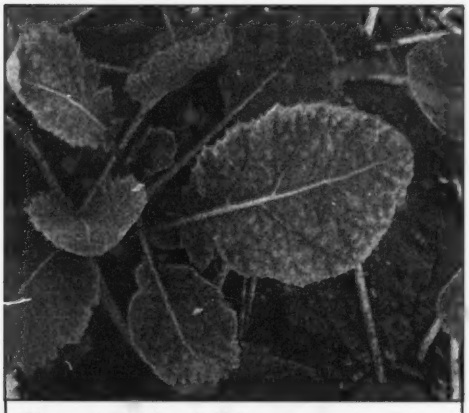

Figure 5. Sulphur deficiency symptoms in canola.
Source: International Plant Nutrition Institute.

Research has shown that a sulphate form of sulphur (ammonium sulphate, ammonium thiosulphate or potassium sulphate) can be applied any time after seeding until about mid-bloom stage to correct a sulphur deficiency in canola or mustard. However, the earlier sulphate-sulphur is applied, the better chance of rescuing yield. Lack of sulphate-sulphur can delay maturity. There is no room for delays in maturity this growing season.

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Crop Scout for Sulphur Deficiencies in Canola and Mustard until the Full Flower Stage **(Continued from page 4)**

Sulphur deficiency symptoms in canola or mustard usually appear in patches. Symptoms include: upward cupping of leaves; interveinal yellowing of the newest leaves in earlier stages of growth; spindly plants; leaves with reddening/purpling on the underside; pale yellow to whitish flowers with a prolonged flowering period; poor pod development; and, filling in advanced stages of growth. **Corrective action must be taken as soon as possible after identifying the deficiency symptoms.**

Granular ammonium sulphate should be applied promptly to minimize yield losses. If ammonium thiosulphate is the source of sulphur, care should be taken to prevent leaf burn. Using split nozzles or dribble tubes will likely cause scorching where the drops hit the leaves. As a last resort, ammonium sulphate dissolved in high volumes of water can be applied to the foliage with fan nozzles when surface soil conditions are dry and there is little chance of rain moving top-dressed granular sulphate-sulphur into the soil. Foliar application should be made in the cooler part of the day to reduce leaf burn. Flowers are more sensitive to damage than leaves and stems, so if foliar fan spray application is used, the ammonium sulphate ideally should be applied before flowering starts. ✡

Late Blight... the Sequel

Connie Achtymichuk, PAg, Provincial Specialist, Vegetable Crops

In the summer of 2009, late blight (*Phytophthora infestans*) was identified on tomatoes and potatoes in numerous locations across Saskatchewan. With the cool humid conditions that have been prevalent through the spring of 2010, the disease may appear again this year. As a matter of fact, late blight has already been found in greenhouse grown tomato transplants in one of our neighbouring provinces. For these reasons, gardeners and commercial producers should check all solanaceous plants (tomatoes, potatoes, peppers and eggplant) to ensure they are free of this devastating disease.

Figure 6: Late blight on potato. Source: University of Saskatchewan

Symptoms

Infection of stems and leaves by the late blight fungus shows up as fast growing water-soaked lesions surrounded by a pale green halo. On leaves, lesions can cross the midrib. When conditions are suitable (cool and moist) the fungus produces white cottony spore masses visible on the underside of infected leaves. A strong distinctive odour accompanies widespread infection.

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Late Blight... the Sequel
(Continued from page 5)

Infected potato tubers develop a reddish-brown discolouration just beneath the skin. The infection develops into a dry rot, but secondary infection by bacteria results in a soft rot that can spread rapidly in storage resulting in substantial decay. On occasion, entire storages become infested with secondary rot, leaving no marketable tubers.

Figure 7: Late blight on tomato.
Source: University of Saskatchewan

Tomatoes exhibit the same leaf and stem symptoms as potatoes, but infected fruit have dark firm lesions, usually at the shoulder of the fruit. Lesions can cause a coppery or bronze finish to the tomato. The infected fruit quickly rot, either in the field or in storage. In tomatoes the disease is usually introduced via transplants that have become contaminated in the greenhouse.

Most popular potato and tomato varieties are sensitive to late blight. Sources of infection in potato include infected seed potatoes and spores drifting in from adjacent diseased fields or cull piles. Under favourable conditions, late blight spores can spread long distances by wind and water. Late blight can also spread short distances on machinery. Spores fall off plants onto the soil and infect tubers through contact. Heavy rains and/or shallow hills encourage tuber infections. Cull piles should be fed to livestock or buried deep, as infected tubers in the piles can produce infected plants that produce spores.

If you think you have late blight, have an agrologist confirm the diagnosis or submit a sample to the Crop Protection Laboratory in Regina. In large fields, if infection is localized, the contaminated area along with a buffer zone could be disked down.

Otherwise, infection could spread to the rest of the field and may also destroy neighbouring fields. Inform neighbours of an infection so that they too may increase their efforts in preventing disease spread.

Storing infected crops
To prevent contamination of potatoes with spores at harvest, first ensure plants are dead. Late blight spores require green living tissue to survive. Fields with late blight should be harvested last, allowing any blight infected tubers to break down prior to harvest. This also ensures that potentially troublesome lots are stored near the storage door in the event that they need to be moved quickly. Grade out all suspect tubers prior to storing the potatoes, and if possible, store infected lots separately.

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Late Blight… the Sequel

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The normal post-harvest curing process should not be followed if a significant portion of the harvested crop is infected with late blight. Instead, cool the pile down as quickly as possible. Provide adequate airflow to dry any wet spots, and monitor the stored potatoes for development of hot spots.

Tips to Manage Late Blight in Potatoes and Tomatoes

1. Always purchase certified seed. However, it is important to remember that late blight is not prohibited under seed certification standards. Ensure that your seed supplier has followed an adequate late blight control program. Purchase tomato transplants from a reputable supplier and carefully evaluate the health of transplants prior to purchase and planting.
2. Eliminate inoculum sources like cull piles and volunteer potato plants.
3. Scout your fields weekly for any signs of disease. Pay particular attention to damp areas such as low spots or sheltered areas.
4. Once a plant has become infected with late blight, there are no production practices or crop protection products that will cure the infection. **Regular applications of protectant fungicides before the infection has occurred provides the best defence.** Apply at least one, preferably two sprays of protectant fungicides to protect the canopy prior to row closure.
5. A seven to 10 day spray schedule should be followed in a normal year. The interval may be altered depending on weather conditions. Systemic fungicides offer protection for longer periods, but are also more expensive.
6. If an infected area is found, destroy the spot and a surrounding buffer area. Healthy looking neighbouring plants, may simply not be expressing symptoms yet. Small infection spots may be pulled, bagged and removed from the field.
7. A large, firm hill will increase the distance spores must travel to reach tubers and will eliminate cracks that act as pathways for infection of tubers.
8. Seed piece treatments lessen the risk of transmission during seed cutting.
9. Staking and pruning tomatoes will increase air flow through the canopy resulting in conditions less conducive to late blight development and spread.
10. Late blight is a community disease. Inform neighbours of the presence of the disease in order to allow them to step up their efforts. Spores can travel several hundred kilometres during storm events.
11. Always read and follow the label directions and recommended chemical rates. Extra product does not necessarily translate into extra protection.
12. Stay in touch with the Saskatchewan Seed Potato Growers Association regarding the status of late blight in Saskatchewan. ✿

Planting Winter Wheat on Unseeded Acres

By Blaine Recksiedler, PAg, Provincial Specialist, Cereal Crops
Mark Akins, PAg, Ducks Unlimited Canada

Excessive rain in May and June in many areas of the prairies has significantly hampered seeding operations prompting growers to look for seeding alternatives. Seeding spring crops past the middle of June is exceedingly risky with the threat of lower yields and frost. Many growers may be forced to abandon seeding plans this spring and chemfallow the land.

Figure 8: Seedling winter wheat.
Source: Ducks Unlimited Canada

Winter wheat has many advantages, and could see increased popularity this fall given all the unseeded acres. Time and pest management, higher yield, marketing flexibility and economics have been some of the key drivers behind the interest in winter wheat. A key consideration for winter wheat production is the availability of sufficient standing stubble. Timing is also important; seeding should occur in the period between late August and early September.

Before seeding winter wheat in chemfallow, it is important to recognize that the stubble is different than that found in a recently harvested crop. Chemfallow stubble has had an extra year of decomposition and is therefore much more brittle. To retain as much standing stubble as possible, avoid cultivating and harrowing. What looks like good snow trapping stubble before seeding may appear quite different after seeding. Farmers can minimize disturbance during seeding by slowing down and using a drill with wider row spacing and narrow openers. Wider seeding equipment will also lessen the amount of stubble damaged by tractor traffic over the field.

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For information about submitting samples to Saskatchewan Agriculture's Crop Protection Lab, go to www.agriculture.gov.sk.ca (Programs and Services > Crop Protection Lab Services); or www.agriculture.gov.sk.ca/web_videos or phone (306) 787-8130.

Planting Winter Wheat on Unseeded Acres
(Continued from page 8)

Following is a list of general tips for successful winter wheat production:

1. Plan for seeding. Prepare equipment and have seed and fertilizer ordered and ready.
2. Seed early (August 20th to September 15th) and seed shallow (0.5 to 1.0 inch deep) to get strong healthy plants before freeze-up.
3. Fertilize for a healthy start by applying 20-25 lb. per acre of P_2O_5.
4. Nitrogen timing, placement and source are varied. Choose a method that fits your farm and farming practices. Chemfallow may have higher levels of available nitrogen but test the soil and match the rate with yield goals.
5. Manage other nutrients in a manner similar to spring wheat.
6. Control perennial and grassy weeds prior to seeding. To reduce risk of wheat streak mosaic virus, avoid seeding adjacent to green cereal crops.

Fall seeding winter wheat may be a solution for some of the unseeded acreage in the prairies. With attention paid to maximum stubble for snow trapping, unseeded acres may be the first step to a successful 2011 crop. If you would like more information on winter wheat production, contact the Saskatchewan Agriculture Knowledge Centre at 1-866-457-2377 or your nearest Ducks Unlimited Canada office. ✿

Managing Disease in a Wet Year

By Faye Dokken-Bouchard, PAg, Provincial Specialist, Plant Disease

So far this has been a wet spring and if summer remains moist we will have favourable conditions for disease this season.

Many plant diseases are favoured by warm, wet weather, often because inoculum production, spread, infection, and/or disease development is facilitated by these conditions. Rain-splash is responsible for spreading "wet" spores of some pathogens. Some examples include ascochyta blights and anthracnose in pulses, blackleg in canola, and septoria leaf blotch in cereals. High humidity and dew are also sufficient to favour spore development, but rain-splash, and to a lesser extent wind, are required for physical dispersal of "wet" spores. High humidity can be sufficient for some diseases to establish in the absence of rainfall. Conversely, powdery mildew is not favoured by rainfall but is favoured by dew (hot, dry days and cool nights). Wind can carry airborne spores farther than rain-splashed spores. These spore types are "dry" and do not require rain-splash, only wind. However, moisture may still be preferable for disease infection. Examples include tan spot of cereals and airborne spores produced by ascochyta and sclerotinia sexual fruiting bodies. Hail, wind-blasting or insect damage may create wound sites that allow easier access of spores into the plant to initiate infection. Plants stressed by poor conditions this spring may be more susceptible to disease.

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Managing Disease in a Wet Year
(Continued from page 9)

Scouting and proper identification of disease is essential no matter what the weather conditions. Refer to the book Diseases of Field Crops in Canada, Saskatchewan Ministry of Agriculture fact sheets, and other field guides for symptom descriptions and photos.

Consider other factors besides weather that may be contributing to disease risk, such as rotation, variety, and past occurrence of disease. Finally, consider whether the crop has the potential to pay for the fungicide application(s). See Table 1.

Figure 9: Ascochyta blight on chickpea.
Source: Saskatchewan Agriculture

Table 1. Calculating Expected Net Return When Considering a Fungicide

Spray Warranted		**Spray Not Warranted**
If expected yield loss per acre ($) is higher than the cost of a fungicide application		If expected yield loss per acre ($) is lower than the cost of a fungicide application
If expected net return per acre is positive		If expected net return per acre is negative
Expected Gross Return ($/acre) =		
Estimated Yield (unit/acre)	X Estimated Yield Savings (%) X	Selling Price ($/unit)
Expected Net Return ($/acre) =		
Expected Gross Return ($/acre)	minus	Fungicide application costs

Given recent conditions, we can expect to see more disease this year, but it is important to remember that early signs of disease do not necessarily translate to immediate need for control. Fungicide timing is important and so is the weather we receive once we reach the proper growth stage for control. See Table 2.

When applying multiple fungicide applications in one season, pay close attention to labelled recommendations for fungicide resistance management. Always follow proper rates, rotate fungicides in different resistance groups, tank-mix fungicides from different groups where registered, and do not exceed maximum number of applications per season.

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Managing Disease in a Wet Year
(Continued from page 10)

Table 2. Critical Stages for Control of Foliar Diseases Favoured by Moisture

Crop	Disease	Critical Stage for Fungicide Application
Cereals	Leaf Spotting Diseases (*Septoria* spp., *Stagonospora* spp., *Pyrenophora* spp., *Cochliobolus sativus,*)	**Three to Five Leaf** May see benefit when cereal on cereal residue, AND symptoms are on newest leaf, AND moist dense canopy, AND crop prices good, AND if early application is followed-up with flag leaf application.
		Flag Leaf Emergence Most important for cereal yield. If only one application, this should be it.
	Fusarium Head Blight (*Fusarium* spp.)	**Early Flowering** Protect the flowering heads. It is too late for control once symptoms are observed.
Chickpea	Ascochyta Blight (*Ascochyta rabiei*)	**Seven to Ten Node** Early application is critical. Consider spray intervals of five to seven days if disease risk is high and every two or more weeks if low.
Lentil	Anthracnose (*Colletotrichum truncatum*) Ascochyta Blight (*Ascochyta lentis*)	**Beginning of Flowering** Although symptoms may appear earlier this year, consider whether the plants are too small to spray. Best control will be achieved prior to canopy closure, with one or more additional sprays in 10 to 14 days if disease risk is high.
Pea	Ascochyta Complex (*Mycosphaerella pinodes, Ascochyta pisi, Phoma* sp.)	**Beginning to Mid Flowering** Consider a fungicide application if symptoms are present and weather is favours disease.
	Downy Mildew (*Peronospora viciae*)	**No Fungicides Registered** Options are currently being researched under the Minor Use Program.
Canola	Blackleg (*Leptosphaeria maculans*)	**Two to Six Leaf Stage** Most varieties have good resistance; however if blackleg has been a problem or physical damage has occurred, disease may appear.
	Sclerotinia (*Sclerotinia sclerotiorum*)	**20-30 Per Cent Bloom** Protect canola petals before they drop. It is too late once symptoms are observed.
Flax	Pasmo (*Septoria linicola*)	**Mid-Flower** Flax is most susceptible to pasmo during ripening; however, epidemics can occur earlier when favourable, moist conditions prevail.

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Crop Considerations as Impacted by Flooding and/or Saturated Soils

By Michel Tremblay, PAg, Provincial Specialist, Forage Crops
Blaine Recksiedler, PAg, Provincial Specialist, Cereal Crops
Ken Panchuk, PAg, Provincial Specialist, Soils
Sean Miller, PAg, Integrated Pest Management Agrologist
Faye Dokken-Bouchard, PAg, Provincial Specialist, Plant Disease

Forages and Flooding

- Forage crop response and tolerance to flooding varies by species and growing conditions.
- Grasses are more flooding tolerant than legumes.
- Cool temperatures slow plant processes and make them more tolerant to flooding.
- Forage species are more susceptible to flooding damage when soil and air temperatures are high and growth rate is rapid.
- Flooding tolerance can vary with age of stand; older stands are generally less tolerant to flooding.

Table 3. Flooding tolerance of forage species

Tolerance rating	Estimated days tolerance (early season)	Species
good	49	Reed canarygrass
good	49	Tall wheatgrass
good	49	Slender wheatgrass
good	49	Western wheatgrass
good	-	Streambank wheatgrass
moderate	24	Smooth bromegrass
moderate	-	Green needlegrass
moderate	-	Northern wheatgrass
moderate	21	Intermediate wheatgrass
poor	-	Meadow bromegrass
poor	-	Altai wildrye grass
poor	15	Alfalfa
poor	21	Russian wildrye grass
poor	10	Crested wheatgrass
poor	5	Sainfoin

Annual Crops and Saturated Soils

- Generally, plants can withstand 24 to 48 hours under flooded conditions.
- Generally, young plants are more susceptible to damage.
- Relative crop tolerance to excess water:
    - **cereal crops:** oats > wheat > barley;
    - **pulse crops:** fababeans > soybeans >>>> peas > lentils and chickpea.
    - **oilseed crops:** canola > sunflower > flax; **(Continued on page 13)**

Crop Considerations as Impacted by Flooding and/or Saturated Soils

(Continued from page 12)

Annual Crops and Saturated Soils (con't)

- Damage can be assessed three to five days after the flooding event.
- Cool temperatures and cloudy conditions reduce damage from flooding.
- Most crops can survive wet soil conditions for three to seven days.
- After the soil dries, soil crusting can physically impede growth of the emerging plant.

Soil Fertility and Erosion

- Soil fertility is not currently an issue because the fertilizer was banded into the soil. Some nitrogen loss is expected under flooded and saturated soil conditions but prolonged flooding is needed for losses to become significant.
- Yellowing of crops is primarily due to saturated soil conditions, lack of sunshine and root diseases. It is not a result of loss or lack of nitrogen.
- Phosphorus movement with soil is expected wherever there is soil erosion from fast flowing water.
- Most cereal stubble fields have been sown using zero-till and will remain reasonably anchored even with some excess water flowing over it. Some soil erosion by water is expected, but much less than would occur under conventional tillage systems.
- Pulse crop stubble fields have little residue and these fields would experience soil erosion by water but not to the extent under a conventional tillage system.
- The greatest soil erosion is expected near creeks and streams where high flows have spilled the banks and are washing the field along the streams. These are danger areas and people and cattle should be kept away from the high stream flow areas. These areas, whether seeded to grass or grain crops, will experience erosion because of the speed of the moving water.
- Many crops are not at an advanced stage of growth because of late seeding, saturated soil conditions, lack of sunshine and root diseases. The crop roots are not large enough stage to anchor significant water flows across them.

Plant Diseases and Excessive Moisture

- Saturated soils lack oxygen, inhibiting root function, causing yellowing of plants. Cool growing conditions slow plant metabolism and lack of sunshine causes plants to turn pale green to yellow due to lack of photosynthesis.
- When plants are stressed under adverse soil conditions, they are more susceptible to seedling diseases such as damping-off, root rot and seedling blight. Symptoms often involve yellowing, wilting, stunting or death.
- Causal pathogens are often fungi that prefer moist soils, and may include *Fusarium* spp., *Rhizoctonia* spp., *Pythium* spp., *Botrytis* spp., *Cochliobolus sativus* (cereal crops) and *Sclerotinia sclerotiorum* (broad-leaf crops). In particular, *Pythium* prefers wet soils, as it is a "water mould".

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Crop Considerations as Impacted by Flooding and/or Saturated Soils
(Continued from page 13)

Plant Diseases and Excessive Moisture (continued)

- While some plants may grow out of their seedling disease issues once conditions improve, others may die or continue to do poorly.
- Farmers are also considering fungicide applications due to foliar diseases. However, it should be noted that many crop disease issues will be secondary to abiotic injury and as a result, the application of fungicide is not economical or advised.
- About 70 per cent of the foliar fungicides in Saskatchewan are registered for ground and aerial application - the rest are for ground use only.
- Foliar disease symptoms generally include discolourations, lesions and loss of or failure to produce leaves and flowers. Later in the season, yield and quality may be impacted. Pathogen spread, infection and disease development are often favoured by rain-splash, high humidity and moist conditions.

Insect Update

By Scott Hartley, PAg, Provincial Specialist, Insect / Vertebrate Pests

Wheat Midge

Wheat midge emergence from pupae in the soil generally begins in southern regions in late June with peak emergence in July, depending on temperature and moisture.

The best estimate of emergence is through the calculation of degree days using 5 C as a base temperature. Wheat midge emergence maps and information on expected emergence in an area are available online: www.weatherfarm.weatherbug.com/farm/login.aspx (there is no charge for this site but you need to register).

Precipitation in the spring is necessary for midge development. Research at AAFC, Saskatoon indicates that less than 20 mm of precipitation prior to the end of May will result in delayed and erratic emergence of the adult midge. Unlike the past two years when areas of the province experienced dry conditions that affected wheat midge emergence, moisture limitations are not an issue in 2010 and midge emergence should be as predicted based on degree day accumulation.

Diamondback Moth

Sentinel traps set up to attract diamondback moth adults continue to indicate presence of the moths. Moth numbers in traps has been highest in southern parts of Saskatchewan and the prairies, but diamondback moths have also been collected in traps in the central region near Saskatoon. Since the moths have been in the province for several weeks, the absence of moths in traps may indicate that the insects are in a different stage of their life cycle. Producers should continue to monitor for diamondback moth larvae in cruciferous crops such as canola and mustard.

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Insect Update
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Pea Leaf Weevil
The pea leaf weevil (PLW) has been in Southwest Saskatchewan for several years. Although the most severe infestations and damage have been in the Southwest, the distribution of this insect continues to expand, especially to the east. A 2010 survey was conducted in June to determine the range of weevil infestations based on damage to the seedlings.

As the name suggests the PLW is a pest of field peas. Faba beans have also been identified as a host plant. In 2010, significant damage to lentil crops has occurred in at least two fields in the southwest, with the PLW the most likely cause. Confirmation of the identification is pending. Although not considered a primary host, the adult weevils will feed on other crops if the preferred host is not available. It is thought that feeding on lentil will result in reduced reproductive capabilities and fewer eggs laid.

Cutworms
Cutworms of various species have been the main insect pest in Saskatchewan crops so far in 2010. Red-backed, dingy and bristly cutworms have all been identified as the cause of damage in canola, pea, lentil and cereals. Damage from dingy and bristly cutworm species are above ground foliar feeding, while red-backed cutworms are more typically below ground cutting of seedlings. When the cutworms are large, generally exceeding 32 mm (1.25 in.) in length they are nearing pupation and most of the damage has been done for this growing season. Mature red-backed cutworms are approximately 38 mm long. Most years the dingy cutworms commence pupation about mid-June, while re-backed cutworms complete the immature stage of their life-cycle at the end of June. Due to cooler temperatures this spring feeding could extend longer.

Production Technology: Who's Who

By Ray McVicar, PAg, Manager, Production Technology Section

The Production Technology Section, Crops Branch, focuses on crop protection, fertility, diagnostics and pesticide licensing and inspections. It includes the Crop Protection Laboratory in Regina, Pesticide Licensing and Inspections, as well as Provincial Specialists in Plant Disease, Insect and Vertebrate Pests, Weed Control, Soil Fertility and Integrated Pest Management.

We work closely with farmers, agronomists, Ministry Regional Services Branch specialists, businesses, researchers and producer groups to provide licensing, crop protection and soil fertility information. We also serve as the Ministry representative on many regional and national committees.

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Production Technology: Who's Who
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Figure 10: *Back Row:* Scott Hartley, Sean Miller, Allan Bakke, Philip Northover. *Front Row:* Jude Kachaluba, Faye Dokken-Bouchard, Carla Weitzel, Jaclyne Shiplack, Ray McVicar, Clark Brenzil, Ken Panchuk. *Insert:* Brianna Brown.

Scott Hartley, PAg - Provincial Specialist, Insect and Vertebrate Pests
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Scott has been the Insect and Vertebrate Pest Specialist since May 1998. His prior work involved insect research with Agriculture and Agri-Food Canada (AAFC) in Saskatoon. His insect specialty was derived from education at the U of S, experience with private industry, developing the economic threshold for grasshoppers in lentil and studying arthropod bio-diversity with AAFC. Scott co-ordinated the fall wheat midge surveys in Saskatchewan from 1993 to 1997 and in Manitoba from 1995 to 1997.

Sean Miller, PAg – Integrated Pest Management Agrologist
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Sean has a Bachelor of Science in Agriculture from the U of S with a major in agronomy and a minor in agri-business. Sean focuses on integrated pest management of insects, diseases, weeds and vertebrate pests and co-ordinates the provincial crop pest surveys. Other areas of interest include crop rotations and general crop and nutrient management.

Jude Kachaluba – Pesticide Licensing Officer
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Jude Kachaluba has been with the Ministry of Agriculture for 31 years, including 26 years as the Provincial Pesticide Licensing Officer. She is responsible for the management, operation and administration of the Provincial Pesticide Licensing Program. Jude maintains the confidential database of Pesticide Applicators, Pesticide Vendors and Pesticide Service (operators) in Saskatchewan. **(Continued on page 17)**

Production Technology: Who's Who
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Allan Bakke, Provincial Pesticide Investigator
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Allan has been the Provincial Pesticide Investigator for six years. The Ministry is responsible for licensing, disposal, storage and transportation of pesticides under the *Pest Control Products (Saskatchewan) Act*. Education plays a major role in compliance and Allan uses opportunities such as presentations to build relationships with industry and explain the regulatory expectations. Part of his role is to mediate drift complaints. Allan also sits on the national Working Group for Pesticide Education and Training and Certification that develops national standards for pesticide training.

Philip Northover, AAg – Supervisor Crop Protection Laboratory
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As supervisor of the Crop Protection Laboratory, Phil provides diagnosis and identification of plant problems. He holds a Bachelor of Science in Ecology from the University of Manitoba and Master and Doctoral degrees in Plant Pathology from Penn State University. While at Penn State he worked in the Crop Diagnostic Clinic, the Fruit and Cereal Pathology laboratories and gained valuable experience in extension. Philip worked with Manitoba Agriculture, Food and Rural Initiatives as the Provincial Plant Pathologist responsible for Horticultural and Forage Crops, and served as a back-up to the Provincial Crop Diagnostician. Philip has experience on a wide range of crops including field crops, trees, fruits, turfgrass, vegetables, greenhouse and forages.

Faye Dokken-Bouchard, PAg - Provincial Specialist, Plant Disease
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Faye is responsible for providing plant disease expertise in the Ministry. She obtained her Bachelor of Science in Agriculture and Master of Science from the U of S. As a student, Faye gained an interest in plant pathology working summers at AAFC and as a teaching assistant for the Department of Biology undergraduate plant pathology class. She worked full-time for both the pulse pathology and cereal/flax pathology programs at the Crop Development Centre before moving to Regina with the Ministry of Agriculture.

Carla Weitzel – Plant Health Technician
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Carla has a Bachelor of Science in Land Use and Environmental Studies from the U of S, majoring in plant biology. Previously working at the Northern Forestry Centre in Alberta, she came to the Crop Protection Laboratory in 2006. Carla specializes in identifying insects, weeds and plant disease causing fungi. Other areas of experience include performing herbicide resistance testing and screening for bee diseases.

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Production Technology: Who's Who
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Jaclyne Shiplack – Plant Health Technician
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Jaclyne has a Diploma in Biotechnology from Saskatchewan Institute of Applied Science and Technology. She previously worked at Prairie Diagnostic Services in Regina and joined our team at the Crop Protection Laboratory in September 2009. She has gained experience doing the fusarium head blight survey, herbicide resistance testing and bee disease screening.

Ray McVicar, PAg – Manager, Production Technology Section
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Ray began his career in the Crop Protection Industry where he worked 14 years in research and sales. He was the Ministry's Provincial Specialist, Special Crops for 15 years before becoming the section manager in 2007. Ray represents the Ministry on a number of national committees and serves as the Provincial Minor Use Co-ordinator.

Clark Brenzil, PAg - Provincial Specialist, Weed Control
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Clark has been with Saskatchewan Agriculture since January 1998. He provides information and recommendations on weed control and weed control legislation to producers, agronomists, governments and agencies, as well as municipalities. He has past experience in the Crop Protection Industry, as well as University and Government research.

Ken Panchuk, PAg – Provincial Specialist Soils
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Ken completed his Masters of Science in Agriculture in 1980 from the U of S. He served as Cereal and Oilseeds Specialist with the Crops Branch from 1980 until 1997. In 1997, Ken became the Provincial Specialist, Soils and continues to serve in this capacity.

Brianna Brown – Dutch Elm Disease Technician
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Brianna is entering her fourth year of Toxicology at the U of S. This is her third summer term with the Crop Protection Lab. Brianna manages the Dutch Elm Disease samples at the lab and completes many other laboratory duties. ✿

The ***Crop Production News*** is a publication of the
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